

REMARKS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 1-34 are presently active in this case, Claims 1, 12, 23, and 34 having been amended by way of the present Amendment. Care has been taken such that no new matter has been entered.

In the outstanding Official Action, the drawings were objected to as failing to comply with 37 CFR 1.84(p)(5) for including reference characters that were not mentioned in the written description. The specification has been amended to include a description of steps S78 and S83. Accordingly, the Applicant respectfully requests the withdrawal of the objection to the drawings.

The specification was objected to because of minor informalities. The specification has been amended to correct grammatical errors, for example, the grammatical errors noted in the Official Action. Accordingly, the Applicant respectfully requests the withdrawal of the objection to the specification.

Claims 1-3, 5, 6, 12-14, 16, 17, 23-25, 27, 28, and 34 were rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuda (U.S. Patent No. 6,285,470) in view of Knox (U.S. Patent No. 5,832,137) and Fields (U.S. Patent No. 5,767,945). Claims 4, 15, and 26 were rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuda in view of Knox, Fields and Jin (U.S. Patent No. 5,880,858). Claims 7-9, 18-20, and 29-31 were rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuda in view of Knox, Fields and Dhawan (U.S. Patent No. 5,271,064). Claims 10, 21, and 32 were rejected under 35 U.S.C.

103(a) as being unpatentable over Matsuda in view of Knox, Fields and Saito (U.S. Patent No. 5,966,455). Claims 11, 22, and 33 were rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuda in view of Knox, Fields and Allen (U.S. Patent No. 6,044,172). For the reasons discussed below, the Applicant requests the withdrawal of the obviousness rejections.

The basic requirements for establishing a *prima facie* case of obviousness as set forth in MPEP 2143 include (1) there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings, (2) there must be a reasonable expectation of success, and (3) the reference (or references when combined) must teach or suggest all of the claim limitations. The Applicant submits that a *prima facie* case of obviousness cannot be established in the present case because the references, either taken singularly or in combination, do not teach or suggest all of the claim limitations.

The Applicant respectfully submits that the cited reference, either when taken singularly or in combination, fail to teach or suggest edge-detection of a digital color original image obtained by digitally inputting only a single side of a document color-printed on both sides of paper, and estimating background color of the paper or background color image on the single side based solely upon edge-detection information from the single side of the document with respect to a portion with low intensity of the detected edge from the single side of the document, in the manner recited in Claims 1, 12, 23, and 34.

Each of Claims 1, 12, 23, and 34 recite inventions that include steps or apparatuses for edge detection using only a single side of a document printed on both sides, and estimation of

background color on the single side based solely upon edge-detection information from the single side of the document. Thus, the detected edge from the single side of the document is an important aspect of the operation of the present invention. (See, e.g., Figure 5 of the present application.) However, the Applicant notes that the Matsuda et al. reference, the Knox reference, and the Fields et al. reference, either when taken singularly or in combination, fail to describe or suggest features.

The Official Action acknowledges that the Matsuda et al. reference does not disclose background estimation based solely upon edge-detection information, among other features. The Official Action attempts to supplement this deficiency in the teaching of the Matsuda et al. reference with the teaching in the Knox reference.

The Knox reference describes an image processing method for mitigating the effects of show-through in scanning a duplexed document in a duplex scanning system. The method described therein includes deriving a scanned first side image P from a first side image A of a duplexed document and a scanned second side image Q from a second side image B of the duplexed document, where at least the first side image P includes a component thereof attributable to show-through from the second side of the document, and storing images P and Q. The method also includes, from second side image Q, generating a representation thereof corresponding to the show-through contribution to first side image P, and processing image P to remove show-through as a function of the representation Q, thereby deriving correct image A.

While the Knox reference does not specifically mention the use of edge-detection information, the Official Action surmises that the use of the term "contrast" suggests such a

feature. The Applicant respectfully disagrees. Furthermore, the Applicant notes that the Knox reference relies upon a scanning and analysis of both side of the paper in order to perform the estimation of background, as is evident from a review of the Abstract of the Knox reference, for example. Thus, the Knox reference does not disclose or even suggest estimating background color of the paper or background color image on the single side *based solely upon edge-detection information from the single side of the document* with respect to a portion with low intensity of the detected edge *from the single side of the document*, as is recited in Claims 1, 12, 23, and 34 of the present application. The Knox reference not only is not able to estimate background color based solely on information from a single side of the document, but in fact the Knox reference expressly teaches away from such a step in column 1, lines 65, through column 2, line 3. Accordingly, the Applicant submits that it would be improper to combine the Knox reference with the Matsuda et al. reference, and that such a combination would not result in a teaching of all of the limitations recited in Claims 1, 12, 23, and 34 of the present application.

Furthermore, the Fields et al. reference is not cited for, and does not teach the missing limitation discussed above, namely, estimating background color of the paper or background color image on the single side *based solely upon edge-detection information from the single side of the document* with respect to a portion with low intensity of the detected edge *from the single side of the document*, as is recited in Claims 1, 12, 23, and 34 of the present application.

Accordingly, the Applicant submits that a *prima facie* case of obviousness cannot be established in the present case because the references, either taken singularly or in

combination, do not teach or suggest all of the claim limitations. Thus, the Applicant respectfully requests the withdrawal of the obviousness rejections of Claims 1, 12, 23, and 34.

Claims 2-11, 13-22, and 24-33 are considered allowable for the reasons advanced for Claims 1, 12, and 23 from which they respectively depend. These claims are further considered allowable as they recite other features of the invention that are neither disclosed, nor suggested by the applied references when those features are considered within the context of Claims 1, 12, and 23.

Furthermore, with regard to several of the dependent claims, the Applicant notes that the Official Action surmises that (a) background density or brightness is determined based on edge detection information by using the method described in the Knox reference, (b) character and show-through can be separated based on distribution of background density on one side of a document by using the method described in the Matsuda reference, and (c) therefore, show-through is corrected by replacing the show-through portion with background density, because the background density is determined based on the edge detection information, and the character and the show-through can be separated based on distribution of background density. However, in the Matsuda reference, the character, the show-through and the background are separated from a histogram of density or brightness distribution. Therefore, the Matsuda reference requires the making of a histogram that is calculated from all over the image or from a local region of the image.

It should be noted that the show-through can occur at locations other than the background, namely a region where some characters or images are printed, on a document.

Therefore, density levels of the show-through or the background differ at regions in an image, which results in scrutiny of density distribution at every region.

A window should be set locally in order to scrutinize the density distribution. The problem is how to determine a size of the window. As disclosed at page 16, line 18, through page 17, line 4, in original specification of the present invention, an image includes a region including a color gradation and a region including a plurality of different colors. If the window size is too small then it results in a failure in correct estimation of the background density or a failure in separation of the background and the show-through, because the window is included in the show-through. As disclosed at page 17, line 5, through page 18, line 1, in the specification, too large window size also results in a failure in correct estimation of the background density or a failure in separation of the background and the show-through, because the window includes a plurality of background density in the region including a plurality of different colors.

However, the Matsuda reference fails to disclose a setting unit which sets various sizes of windows for calculating the density histogram at every region in the image.

Thus, a unique feature of the present invention is a step of setting the size of the window (see, e.g. Claims 9, 20, and 31), which can be used for example to scrutinize intensity distribution at every region in the image, both in a region including a color gradation and a region including a plurality of different colors, as disclosed at page, 19 lines 2-15. For example, as disclosed at page 19, lines 2-15, the size (S) of the window is initially set, and according to the size of the show-through to be removed, the background density is estimated within the window having SxS size (page 22, line 21, through page 28, line 4) for generating

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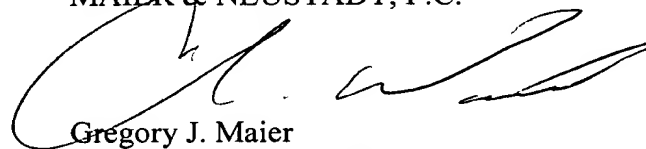
an image by replacing a weaker edge with a background density which varies according to the region. Although a condition in the window having the size of SxS might be one of the cases described at page 16, line 18, through page 17, line 4, it is typically difficult to know which one the condition of the window, which is currently processed, is. However, if an inappropriate replacing is performed, then a false edge which will never exist in original image will be generated in the image replaced with the background density (page 18, line 7, through page 19, line 1). As disclosed at page 28, line 5, through page 30, line 21, estimation of the background density is retried with smaller window size in the vicinity of the false edge.

Such a method as recited in several of the dependent claims as noted above, or as described in the exemplary embodiment above, is clearly not disclosed or suggested by the art of record.

Consequently, in view of the above discussion, it is respectfully submitted that the present application is in condition for formal allowance and an early and favorable reconsideration of this application is therefore requested.

Respectfully Submitted,

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